THE
VETERINARY RECORD.

The Official Journal of the National Veterinary Medical Association of Great Britain and Ireland, Limited.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 21. MARCH 21, 1925. VOL. 5.

Milk Fever: Its Possible Association with Derangements in the Internal Secretions.*

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While the etiology of milk fever has received much consideration in the past, we are still without knowledge of the essential nature of the disease. Twenty-eight years ago Schmidt gave us a simple specific remedial measure, in intra-mammary injection. It has often been felt that our possession of so simple a remedy should have afforded us a valuable clue to the pathology of the disease, yet, although many hypotheses of a highly speculative nature have been advanced, none of those capable of test by experimental methods has shown itself worthy of general acceptance. We are still confronted with an enigma-tantalus—could we comprehend the nature of the disease, the meaning of the dramatic recovery following insufflation should become evident. Could we understand the action of the remedy, the nature, not only of milk fever, but of the whole group of eclampsias to which it appears to belong should become capable of conception. That the problem of the specific action of mammary distension has so long remained unsolved occasions us no surprise, since we believe it can be made clear only in the light afforded by recent physiological research.

In view of the need for a free expression of considered opinion upon the subject, we welcome the papers by Mr. L. P. Pugh. Pugh (1) brought forward a suggestion that there is a strong resemblance between the symptoms of this disease and a toxæmia of the botulismus type. The same writer further elaborates (2) the etiology of the disease by postulating the existence of a ketosis as the predisposing factor to the development of the botulismus intoxication. A survey of this latter paper conveys the idea that the author has been tempted to support his hypothesis by *data* that are not above criticism. It is well, in seeking to elucidate the etiology of any disease, that the problem should be approached without bias if a satisfactory conclusion is to be arrived at. We do not think that Pugh has exhibited sufficient caution in this respect, and one of our objects in criticising his paper is to correct, thus early, certain errors in his premises, so that subsequent investigators may not be misdirected.

To take the points as they appear in his paper, he makes the statement that, after the digested fat is re-synthetised in the villi of the intestinal mucosa, it passes from there to the liver. Now, this is not so; it was shown as long ago as 1885 by Schafer (3) that the fat is absorbed into the lymphatics of the gut and is then transported, *via* the receptaculum chyli and the thoracic duct, into the blood stream to be distributed throughout the body. This has been confirmed by many subsequent workers, including Zawarykin (4) and Clark and Clark (5). While it is *conceivable* that a small amount of the fat may be absorbed *via* the portal circulation, it has never yet been demonstrated. Again, Pugh says that "if a fat containing iodine is fed to an animal, that same type of fat will be found in the depots . . . ." Surely he has confused this with a reference to the "iodine value" of fats—quite a different thing.

It is true that the incomplete desaturation of the fats in the liver and the consequent formation of hydroxy-acids and acetone bodies may become evident by the appearance of such products in the urine, but the converse does not necessarily hold. Pugh does not seem to be aware that an acetonuria does not necessarily imply an acidosis; it may be present in alkalosis (6), and this point will be referred to later.

Pugh states that very little is known regarding the conversion of depot fat into butter fat, but, nevertheless, he bases his whole hypothesis on the assumption that the liver is the all-important organ which creates this change. He quotes Coope and Mottram (7) to support the view that there is a relatively sudden increase in the liver fat at parturition, but it should also be mentioned that these workers in the same paper recorded that in cats, fatty infiltration was found in the liver in some non-pregnant cases, and that therefore "no certain conclusion can be drawn from the infiltration found in pregnant animals." That the liver is not required to desaturate fats and that this can take place in, *e.g.*, incubating eggs, was tentatively shown, also by Mottram (8).

Dealing more specifically with the function of the liver in building up butter fats, Pugh states that when the fatty infiltration of the liver occurs, the store of glycogen in the liver "is relatively low"; in other words, he imples that the fat and the glycogen in the liver cannot increase *pari passu*—it is either one or the other. This is an important assertion and it is fundamental to his argument, but unfortunately, no authority is quoted. Granting this statement to be correct, which we doubt, it does not necessarily follow that a diminution in the liver glycogen should give rise to an acidosis. It must be

*Received on February 12th, 1925.

remembered that the liver has a plentiful supply of blood *via* the hepatic arteries, and from this blood it can draw all the carbohydrate necessary for the due performance of its functions, if there be enough glucose in the circulation.

Now, in his definition of acidosis he says this is a condition " characterised by an excess of sugar in the blood." If, then, there be an excess of sugar in the circulation, a deficiency in the liver glycogen is of no significance unless suggesting that here we are dealing with a condition of diabetes mellitus. If that be granted then the whole aspect of the case is altered; we are now concerned primarily with a functional derangement of the pancreas, and not of the liver. It has never been suggested that milk fever represents a diabetes mellitus, and Pugh himself does not go to this extreme; if then an acidosis does exist, it must be one of that type, the etiology of which is totally different from that postulated by Pugh.

In an acidosis, other than that associated with diabetes, two factors may exist either independently or concurrently:—

(*a*) An excessive production of acid metabolites;
(*b*) An insufficient supply of carbohydrates to the body.

Carbohydrates bulk largely in the diet of cows, and it is agreed that milk fever occurs particularly in the well nourished animal. We may then exclude condition (*b*) as being a contributory cause and consider in more detail the factor (*a*).

It has been demonstrated by Meigs, Blatherwick and Cary (9) that all the milk fat is derived from the phosphatides in the blood plasma. These phosphatides are derived primarily from the fat of the food. Morgan, Beger and Fingerling (10) have shown that the quantities of milk and milk fat secreted diminish *pari passu* with a diminution in the milk fat of the diet. Further, Eckles and Palmer (11), and Bowes (12) have shown that the quality of the butter fat is modified by the character of the fat in the food.

In addition to Schafer (13) it has also been shown by Heidenhain (14) that the re-synthetised fat from the intestine is carried *via* the thoracic duct and is delivered as finely comminuted particles of fat about 1μ in diameter, either free or in the lymphocytes, into the blood stream. During this absorption, the phosphatide content (particularly lecithin) of the blood rises, Bang (15), Bloor (16), and this increase is most pronounced in the lymphocytes. From this latter observation and the fact that there was a preliminary increase of fat in these corpuscles, these workers conclude that the change from tri-glyceride to phosphatide *takes place in the corpuscles themselves.* Bloor (17) and Horiuchi (18) have shown further that lecithin passes readily from the corpuscles to the plasma. Now, these changes could not take place so readily without the presence in these sites of the appropriate enzymes, but Thiele (19) was able to discover in chyle and blood an enzyme which could hydrolyse phosphatides, and he found a similar ferment present in tissue extracts. These ferments are stated by Bloor (20) to be distributed in general throughout the body. The liver, in common with other tissues, has its share of these ferments, but there is no reason to postulate that the liver is the main tissue in which these changes occur.

We see, therefore, that there is no reason why an *acidosis* should develop, even under stress of a clamant demand for milk secretion. If the phosphatides are present in the blood stream, they can be readily used to produce the milk, and if they are not so wanted they may remain in the blood in excess, or they may be deposited in the fat depots of the body mainly as tri-glycerides. Terroine and Weill (21) after a series of experiments, have come to the conclusion that the liver is not one of the store-houses for fat in the body. Further, Bell (22) came to the decision that alimentation and the store of fat in the liver are not related. He failed to find fat in the hepatic cells of very fat cattle, although some was found in the liver of two moderately nourished animals.

We are of the opinion then, that however attractive the idea may be of an "acidosis" being the precursor of milk fever, that the hypothesis is open to many objections. Restriction of diet, it is generally admitted, limits the tendency for milk fever to develop, but there is also evidence to show that such procedure can be utilised as a causative factor in the production of acidosis.

If Pugh had asserted that an acidosis might be merely associated with an attack of milk fever, we might have accepted that statement, because *during* the attack, an evanescent acidosis may assert itself, caused by an over-production of lactic acid, due to the excessive muscular action characteristic of the milk fever syndrome. This is one of the factors we referred to under heading (*a*).

But let us admit for a moment the validity of Pugh's hypothesis that the ketosis which he claims to be present results from the rapid conversion of depot into butter fat.

Pugh states that " complete emptying of the udder acts indirectly as a stimulus to the metabolic activities of the liver since it calls for fresh transferring of depot into butter fat. Equally the distension of the udder (whether by air or fluid) slows down these processes. By so doing it diminishes or abolishes the formation of ketones and allows of recovery."

In this statement he seeks to explain both the reason for the production of ketones and the rapid response on the part of the patient to mammary insufflation.

While we admit that the mere condition of emptiness in the functioning mammary gland provides an important stimulus to further milk production and that pressure upon the walls of the mammæ tends to prevent this stimulus, it must be remembered that in milk fever the production of milk is arrested, the udder is flaccid and comparatively empty; therefore, if ketosis occurs, it does not arise from the rapid conversion of depot into butter fat in the production of milk.

We think it may be fairly assumed that intramammary insufflation acts in the nature of a simple

mechanical process, since its effect is the same whether air or fluid be injected. As has been indicated, Pugh apparently accepts this view in attempting to explain the cessation of ketone formation, but gives no indication of the method by which this simple mechanical process brings about the elimination of those ketones already formed; further, he postulates ketosis as representing merely the predisposing factor in the etiology of the disease; the actual determining factor, the botulinus toxin, must therefore also be neutralised and its effects upon the body organism overcome. Now, since intra-mammary insufflation produces an almost immediate effect in many cases of milk fever, it is obvious that if the disease represents a ketosis predisposing to botulinus intoxication, then this mechanical process not only succeeds in bringing about the elimination or neutralisation of free ketones, but also in the overcoming of the effects of that portion of botulinus toxin which has already entered into combination with the body tissues.

In short, if milk fever represents a ketosis which predisposes the animal to the ready absorption of botulinus toxin, then Pugh's conclusions as to the effect elicited by intramammary insufflation may be summarised as follows:—

(1) The immediate suppression of further ketone formation.
(2) The immediate neutralisation or immediate elimination of ketones already formed.
(3) The immediate overcoming of the *effects* produced by that portion of botulinus toxin which has already entered into combination with the body tissues.

We find ourselves quite unable to accept such conclusions.

Assuming now, Pugh's explanation of the effect of intramammary insufflation to be correct, since this treatment has proved specific, not only in milk fever, but in certain other conditions, *e.g.*, post-parturient dyspepsia, parturient eclampsia of mares, and in a proportion of cases exhibiting the syndrome called "stomach staggers," it might be reasonable to assume that these conditions are also due to a ketosis which is mechanically overcome by intra-mammary insufflation.

These conditions, however, are not necessarily associated with the puerperium which Pugh regards as being so intimately, if indirectly, concerned in the production of ketosis. It is true that post-parturient dyspepsia, so commonly met with in the South and West of Scotland, almost invariably makes its appearance in the second or third week after calving, and that eclampsia in mares, while occurring at any time during lactation is often seen about ten days after foaling; but many cases exhibiting the "stomach staggers" syndrome and which respond to intra-mammary insufflation occur at all stages of lactation, and even in the "dry" cow (Smythe 25); (Pickering 24); and (Jacob 23).

The "stomach staggers" complex closely resembles milk fever; in fact it may be said that if the attack occurs late in lactation it is termed "stomach staggers," and if it occurs within a month or two after calving, it is called "deferred milk fever."

It may be mentioned that the treatment has also been successfully applied in the "stomach staggers" complex as it occurs in animals other than the cow, *e.g.*, the ewe (Masson 26); (Pickering 28); and the goat (McAleer 27).

If it be true (and we believe it to be true) that cases clinically identical with milk fever occur in the non-lactating cow, and that these cases respond promptly to a mechanical procedure, *i.e.*, intra-mammary insufflation, then it would appear that we have in milk fever a condition which is not necessarily dependent upon parturition or lactation for its production, indeed, we may venture to go further and suggest that a number of the cases of so-called "stomach staggers" which occur in the fed bullock are allied in their essential pathology to milk fever as it occurs in the parturient cow. Later in this paper we will state what we consider to be the toxic factor which operates in all the milk fever group of symptom-complexes.

We are indebted to Pugh for having brought to our notice the similarity of the milk fever syndrome to those of the botulismus group, but until it be shown that organisms of the botulinus type are concerned in its etiology, such a similarity may be one of mere chance and does not justify Pugh's statement "that milk fever *must* now be added to the growing list of disorders referable to some organisms allied to *B. botulinus seems established*" (italics are ours). Failing demonstrable proof of the supposed rôle played by the bacillus, we would suggest that the complement fixation test with *B. botulinus* as the antigen might be applied.

We are conscious that criticism, to be helpful, should also be constructive, and with the object of promoting discussion, we venture to formulate a hypothesis as to the nature of milk fever and those diseases which resemble it in their clinical symptoms and in their response to mammary insufflation.

We have been impressed by the idea that milk fever arises from the action of a toxin which may be of endogenous or exogenous origin, although not necessarily a bacterial product; as has been indicated, there are difficulties in reconciling the intoxication hypothesis with the cure effected by intra-mammary insufflation, and in seeking for an explanation we have considered that such would probably be found in the field of endocrinology.

In the foregoing we have stated our view that the action of mammary insufflation is a mechanical one and that it is therefore probable that those conditions, other than milk fever, which respond to it, are all essentially allied with that disease in their pathology. In further support of this view, it may be noted that their clinical symptoms bear a strong general resemblance to those of milk fever. W. L. Williams (29) in discussing the question of the relationship between milk fever and the eclampsias of the domestic animals and of woman sums up as follows:—"It would appear

that, until some positive knowledge as to the actual causes of these diseases is obtained, they should be considered as constituting one great group dependent upon the same general causes. The disease is expressed somewhat differently by the various species of animals. Here and there a case occupies a middle ground between the symptoms recognized as characteristic of two different members of the group, constituting connecting links which serve to bind them more or less closely together into a highly interesting class of diseases."

We may add that Williams' opinion was formed solely upon the similarity which exists between the clinical symptom-complexes of these diseases, and (1909) before it was realised that they all respond to intra-mammary insufflation (with the exception of the eclampsias of the sow and the bitch, in which animals, we believe, the treatment has not yet been applied).

To enumerate briefly the symptoms of the milk fever complex; we find that the animal at the onset of the attack exhibits excitement and restlessness, manifested by a staring expression of the eye, dilatation of the pupil, giving the animal a " wild look." and by a tripping or " paddling " of the hind feet. There shortly appear spasms in the muscles of the head and neck; maniacal symptoms may develop; weakness rapidly supervenes, and to the accompaniment of tremors in body and leg muscles, the animal becomes decumbent. Consciousness is soon lost and the muscles, passing into spasm, the limbs may assume the flexor or extensor position (in parturient eclampsia of the mare trismus is a prominent symptom). Concurrently there is developed a loss of the swallowing and coughing reflexes; the arrestment of defæcation and micturition; the pulse is accelerated, respiration is slowed, and the body temperature, particularly at the extremities, is lowered. To this may be added the observations that milk fever is much more liable to occur after easy births and in animals which are well nourished or which have been receiving a diet rich in proteins.

An examination of these symptoms makes the suggestion attractive that we are here dealing with two super-imposed classes of phenomena, each in itself distinct.

The muscular tremors and the spasms are suggestive of an increased irritability in the somatic neuromuscular mechanism, while the disturbances in the viscera could be interpreted in the light of a hypotonus of the para-sympathetic system.

As already indicated, we feel that some light might be thrown upon the etiology of these symptoms by a consideration of the functions of certain of the endocrine organs.

Among the likely endocrine glands, upon which our attention was focussed, were the thyroid, the para-thyroids and the adrenals. Without discarding entirely the idea of the thyroid being involved (for reasons which we need not enter into here) we were more particularly impressed by the part which might be played by the two latter organs.

It is generally assumed that the para-thyroids exert some influence in the neutralising of toxic metabolites. This was first suggested by Vassale and Generali, 1896 (30), as the result of their observations upon parathyroidectomised animals. Since then much work has been done upon these glands, and even yet no unanimity of opinion exists as to the mechanism of their action.

Briefly, it may be stated that removal or atrophy of the para-thyroids gives rise to a condition of tetany. This commences by the animal's exhibiting restlessness which is later followed by the appearance of fibrillary tremors in the muscles of the forepart of the body. At first walking is possible, but later a cerebellar gait is developed, the pupils are dilated, and eventually the animal falls to the ground with its muscles in a condition of spasm, and finally unconsciousness supervenes followed by death.

Such is the picture in a well-developed case, but there are all degrees of severity.

Simpson (31) performing para-thyroidectomy in 100 dogs had as many fatalities; four lambs operated on all died, whereas four sheep survived the operation. Observations such as these have led to the conclusion that the nature of the food has a bearing on the severity of the symptoms, these being less severe in herbivora as compared with carnivora. This finding led naturally to an investigation into the metabolism of animals which had been deprived of their para-thyroids and thus to a search for the cause of the symptoms. It was shown early by Leopold and von Reuss, 1908 (32), that there resulted a deficiency of calcium in the body; this was confirmed by Howland and Marriott (33) and, amongst other workers, by MacCallum and Voegtlin, 1909 (34), and by Berkeley and Beebe, 1909 (35).

These latter workers also observed that injection of calcium salts temporarily relieved the symptoms, and they concluded that the tetany was due to a calcium deficiency caused by the para-thyroidectomy. In 1912, Koch (36) discovered methyl-guanidin in the urine of dogs deprived of their para-thyroids, and this was confirmed by Paton, Findlay and Burns, 1915 (37), who, stimulated by the observations of Pekelharing, 1910 (38), investigated the effects of guanidin hydrochloride injections upon the muscles of mammals. They found all the resultant phenomena exactly similar to those occurring during parathyreopriva. The guanidin was found to act, *first* as a stimulant and *then* as a paralysant of the neuromuscular junction. It had a similar effect upon the central nervous system; these effects varying n *intensity* and *quality* in the different systems without relation to one another.

Burns and Watson, 1918 (39), in further extension of this work were able to confirm it and concluded that para-thyroid deficiency and guanidin poisoning differed only in degree. They showed that the tachycardia was due to a hypo-functioning of the cardiac fibres of the vagus.

Carlson, 1912 (40), investigated the condition of the alimentary tract in a large series of animals

deprived of their para-thyroids. He found there was no evidence of hyper-excitability of the neuro-muscular mechanism of the alimentary tract. There was less ability to digest the foodstuff, and any deviation from the normal was towards relaxation of the gut.

Such are the conditions exhibited when an animal has all its para-thyroids removed; but there is an intermediate state wherein an animal may possess para-thyroids which are functioning less efficiently than normal. In this condition it is able to meet the usual metabolic requirements of the body, but it possesses a lessened ability to combat the effects of calls made upon it in excess of the normal. Such a condition is known as latent tetany, and our suggestion is that cows exhibiting milk fever and the allied diseases here referred to are suffering from this defect. Haberfeld, 1911 (41), reports such a case in a woman without her complete quota of para-thyroids. She developed no symptoms until she became pregnant. The effect of the increased metabolism resulting from this could not be successfully combated and she developed tetany. This has also been shown experimentally by Massaglia, 1921 (42), who has performed partial para-thyroidectomies on bitches and female cats. These showed no unusual symptoms under normal conditions, but during pregnancy tetanic convulsions manifested themselves.

In concluding this summary of the effects of para-thyroid deficiency we would also draw attention to the observation of Carlson and Jacobson, 1911 (43), who found in some of their experimental animals a decreased *reflex* excitability of the skeletal muscles, due they suggest to a lessened irritability of the somatic sensory nerves.

Our view is that the phenomena of milk fever and its allied diseases are consistent with the conception of a relative para-thyreopriva. The animal during pregnancy is able to meet the strain of the increased metabolism involved, but it is on the borderline. The danger point is, however, not far distant, and it is approached more closely the more intensive the feeding. It has been shown that a diet rich in proteins predisposes to the formation of guanidin compounds. The climax is reached in the early days of the puerperium when the body is now putting its house in order and thus creates a still greater protein metabolism. Hence the para-thyroids are unable to cope with the demands made upon them and toxic metabolites gather in the blood with their consequent sequelæ. We suggest that support is lent to our hypothesis by the observation that "stomach staggers" and post-parturient dyspepsia are also commonly associated with the administration of a rich protein diet and with derangements in the function of the alimentary tract.

The typical signs of guanidin poisoning are manifest in all the diseases enumerated; preliminary excitement, dilatation of the pupil, increased irritability of the neuro-muscular mechanism giving rise to muscular tremors and spasms; the gait is interfered with and the animal finally collapses. The lessened sensibility of the sensory nerves (43) combined with hypotonicity of the vagi (39) and spasm of the pharyngeal constrictors create abolition of the swallowing and coughing reflexes. The increased pulse is due to the lowered tone of the cardio-inhibitory fibres (39); and the cessation of defæcation and micturition to the depressing action upon the para-sympathetics, while the toxic effects of guanidin upon the secretory activities of the kidneys result in anuria. The arrestment of the involution of the uterus and the lowered blood pressure could be accounted for by the concentration of the guanidin being sufficient to paralyse all plain muscle. Assuming our hypothesis to be correct, there will be of necessity an existing diminution in the tone of the para-sympathetics; this, in effect, means that we are, as a matter of fact, dealing with a *relative* sympatheticotonia. (In view of Pugh's hypothesis, it is perhaps only fair to state that one of us had previously noted that an apparent sympatheticotonia existed in an assumed botulismus syndrome, viz., grass disease in horses.)

We consider this view of importance. We are here dealing, not with an absolute sympatheticotonia, but with a relative preponderance of this system. That being so, there would be no excessive secretion of adrenaline into the blood stream, for it has been shown by Dreyer (44) and others that the secretory fibres to the adrenals are contained in the sympathetic nerves.

The circulation of adrenaline in the blood stream plays an important rôle in controlling the rate of oxidation in the tissues. If, therefore, its supply is subnormal or only normal, there will be a lessened destruction of the metabolites of pregnancy. And so another factor is added to the condition already existing. We have now in addition to the hypo-functioning of the para-thyroids, a failure of the adrenals to cope with the increasing toxæmia by increased outpouring of adrenaline.

Then the last determining factor occurs—an *easy birth*. If the labour had been severe, with much manipulation, the tide might have been turned. The stress and strain of a difficult labour, with possible instrumental interference would have created such impulses in the afferent nerves as to have stimulated the entire sympathetic system. The natural result of this would be to create a greatly augmented outflow of adrenaline into the circulation, to be followed by a rapid oxidation of the excessive bye-products in the blood and the prevention of the symptoms of milk fever.

This, we would suggest is the mechanism of the somewhat dramatic recovery after intra-mammary insufflation. Where nature has been gentle, the clinician may require to be drastic. We suggest that the insufflation of the mammæ is such that the pressure developed gives rise to powerful afferent stimuli which reflexly stimulate the outpouring of adrenaline. That the stimulation of afferent nerves gives rise to increased adrenaline secretion has been known for many years. That the extra adrenaline in the blood stream may hasten the normal oxidation

processes has been shown by Marine (45) and by Eppinger, Falta and Rudinger (46); the latter workers having demonstrated that the injection of adrenaline causes increased metabolism of both fats and proteins. Sandiford (47) further has shown that the increase in the rate of metabolism following the subcutaneous administration of adrenaline may commence in a few minutes and the effects may persist for hours.

The action, however, of adrenaline varies qualitatively as well as quantitatively according to the amount in the circulating blood. It has been demonstrably proved that relatively small amounts of adrenaline injected into an animal give vaso-dilatation and a fall in blood pressure, whereas, larger doses as is well known, give vaso-constriction.

Paton and Findlay, 1917 (48), have shown that *small* doses of adrenaline increase the excitability of muscle; and Burns and Watson, 1920 (49), showed that the presence of guanidin increases enormously the sensitising effect of adrenaline upon muscle; and further, we have the observation of Guleke (50) that the administration of a small dose of adrenaline to an animal which has had its para-thyroids removed, will precipitate the onset of tetany.

From these observations we can correlate the fact that fright, worry or excitement may usher in an attack of the milk fever syndrome, either as it occurs in the lactating, but non-parturient, cow, mare, ewe and goat, or in the non-lactating cow. The stimulus of fright or of the distress occasioned by restraint, etc., is sufficient to cause only a small secretion of adrenaline, enough to sensitise the tissues, but not enough to hasten oxidation rapidly. Likewise an *easy* birth, by its relatively small disturbance to the animal, elicits only a small secretion of adrenaline.

The occasional failure of mammary insufflation to effect a complete cure may be traced to the fact that the insufflation was not pursued to a sufficient degree and hence the necessary stimulus for the reflex secretion of abundance of adrenaline was not initiated or, alternatively, that the case represented an unusually heavy guanidin intoxication. The necessity in certain cases for a second or third insufflation of the mammæ may be readily deduced from our hypothesis; the first treatment gave a secretion of adrenaline only sufficient to carry the animal over a limited period, but not passed the danger threshold; the subsequent insufflations completed the cure.

It might be fairly suggested that, if our hypothesis is reasonably correct, the symptoms of milk fever might be combated by the injection of adrenaline. It is of interest to observe that adrenaline has long been known to exert a beneficial influence when given in conjunction with the classical treatment and that Metzger (51) treated one case with adrenaline alone and effected a cure. While we do not contend that an isolated case such as this proves our claim, we at least think that these facts are suggestive.

Prior to 1897 it was generally accepted that, notwithstanding the low blood pressure of the patient, the removal of large quantities of blood proved markedly beneficial in many cases of milk fever. This, again, is in complete accord with our view of the etiology of the disease, since it is well known that, in guanidin poisoning, the removal of a considerable quantity of blood so lowers the guanidin content, that a marked improvement in the patient's condition is produced (52). Since, too, as has been mentioned, constipation predisposes to guanidin absorption, we can understand the prophylactic value still attached to the administration of purgatives towards the completion of pregnancy when, of course, the bowels are naturally sluggish.

We have not lost sight of the disturbance in calcium metabolism due to the para-thyroid failure, which may act concurrently with the deficiency of the adrenaline. This shows itself by an increased excretion of calcium through the normal channels, so depleting the blood of its necessary quota. Colostrum and milk contain calcium as one of their normal constituents, and it is conceivable that a larger percentage than usual may be secreted in milk fever. Hence, any factor which will tend to retard the formation of milk will tend to conserve the supply of calcium in the blood. In this may lie the significance of the efficiency of *a restricted withdrawal of milk* in the prevention of the disease.

With reference to Pugh's observation that he found ketones in the urine of cows suffering from milk fever, we feel it worthy of mention in support of our view, that Underhill and Saiki, 1908 (53); Cooke, 1911 (54), and Wilson, Stearns and Janney, 1915 (55), all found the presence of diacetic acid in the urine of animals which had been deprived of their para-thyroids, although they were agreed that the acid base equilibrium of the blood indicated an alkalosis; while acetone has been demonstrated in the urine and milk, and aceto-acetic acid in the urine of cases of post-parturient dypsepsia (56).

To summarise the points raised in this hypothesis, they may be briefly stated as follows:—

We suggest that the animal is suffering primarily from a para-thyroid deficiency. The para-thyroids cannot cope with the increased metabolism incidental to pregnancy and parturition. Faulty metabolism sets in, and an accumulation of protein toxins (*e.g.* guanidin) gathers in the body; the formation of guanidin in the bowel and its absorption are facilitated by intestinal stasis and its associated intestinal derangements. There is also a diminution in the available calcium. The tissues are on the point of reacting to this condition when relatively slight excitement, by releasing a certain quantity of adrenaline, sensitises the tissues and precipitates the crisis. A form of tetany results.

Insufflation of the udder, by initiating powerful afferent stimuli, reflexly causes an excessive secretion of adrenaline and possibly prevents further calcium loss. The adrenaline now exerts its power of hastening oxidation, the toxins are burnt up and the blood pressure raised. Recovery takes place.

We are conscious of the danger that exists in first promulgating a hypothesis and then submitting it to experimental investigation, but we venture to seek publication for this paper in the belief that it opens up a new avenue by which the investigation of the disease may be approached, and in the hope that it may at least lead to a new line of thought and discussion.

In pursuance of our argument, we are at present conducting experimental investigations into such points as are subject to demonstrable proof, and any results which we may obtain, whether in support or otherwise, of our hypothesis will be communicated.

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A few useful Drugs—Their Actions and Uses in Veterinary Practice.*

By W. GARDNER, M.R.C.V.S., Maybole.

At our last meeting I was approached by our worthy Honorary Secretary, Mr. David Brown, and asked to prepare a paper for this meeting. For several reasons I would have preferred to have had my turn deferred till some subsequent meeting, but, knowing a Secretary's difficulties, I readily consented; but I did not so readily recognise how little time is at the disposal of a busy country practitioner for work of this kind.

While I fully appreciate the honour—a double honour to me—with the presence in our midst of the members of the West of Scotland Division, I feel very strongly that any contribution, whatever the subject of my choice, might have been taken up by a member who could do it greater justice.

The subject about which I wish to speak is "A few Drugs, their Uses and Actions in Veterinary Practice."

I need not dwell on the difficulties necessarily associated with any attempt to deal with a matter presenting so many "fields"—too many to be explored in the time at our disposal. I therefore crave your kindest consideration for imperfections and incompleteness, which must be patent to all of you.

At the outset, it will be understood that an attempt has not been made to exhaust a subject, in some respects self-evidently inexhaustible, but simply to place a short glossary on paper, with some thoughts, which may possibly afford a basis for discussion, which I trust may be a healthy and a profitable one, and therein my deficiencies will be more than made good. Further let me say that, when Mr. Brown ventured to risk the success of this meeting by placing me—a comparative novice in debate—before you he was, in my opinion, guilty of an indiscretion for which

*Presented at the meeting of the West of Scotland and Ayrshire Divisions held at Ayr, on October 9th, 1924.

you will later on have the opportunity of calling him in question.

ACONITE acts as a sedative, especially on the peripheral endings of sensory nerves, on heart and on respiration. Its physiological actions as a cardiac and respiratory sedative render it a febrifuge. It is also diaphoretic and diuretic. I use Fleming's tincture —four times strength of the B.P. tincture, and it should be used carefully on account of its concentration. I have found it very useful in cases of pleurisy, laminitis, and maminitis. It slows and steadies the action of the heart, reduces the temperature and lessens the perception of pain. *Dose* 5 to 10 mms. horse.

ADRENALIN is the most powerful hæmostatic and constringent at our disposal. It reduces congestion and prevents or checks capillary bleeding, and arrests hæmorrhage. Its action is prompt and effective in cases of conjunctivitis and iritis. As an injection into swollen *prolapsus uteri*, and vagina in cattle practice, I have had good results with it. It is most useful also in reducing and obviating hæmorrhage in surgical operations, and can be injected or applied, with advantage, conjunctly with cocaine in local anæsthesia. In this way the action of cocaine is localized and a smaller quantity would suffice for efficient analgesia.

I have had excellent results, in cases of acute parturient laminitis, with the subcutaneous injection of one c.c. of 1 in 1000 adrenalin chloride solution over the internal and external digital arteries at the level of fetlock joint—repeated in twenty-four hours if necessary. The improvement was most perceptible. Moreover, I can with confidence recommend it in cases of azoturia, two drachms of adrenalin chloride sol. injected deeply into muscles of back, twice daily—having firstly given 1 gr. arecoline hydrobromide.

ARECOLIN is a valuable drug in cattle practice but should only be used where the digestive tract is free from a total obstruction and where there is no heart or lung depression or weakness. It is a sialogogue, intestinal stimulant and purgative, very useful in impaction of the rumen or reticulum. I have discarded the prodigious use of mag. sulph. in such cases long ago. I have had good results in use cases of azoturia and acute laminitis. *Dose*, 1 gr. arecoline hydfobromide, injected subcutaneously.

ARSENIC.—A useful drug. Prescribed externally as a stimulant, caustic, antiseptic and parasiticide, valuable in the treatment of quittor, fistulous withers, and parasitic skin affections.

Internally—as an alterative stimulant and gastro-intestinal tonic and further as an anti-spasmodic in nervous diseases, of great benefit in cases of chorea, most conveniently administered in liq. arsenicalis, B.P. (Fowler's Sol.) which contains 4½ grs. to the fluid oz. *Dose*, Arsenic alb. II. to VI. grs. Liq. arsenicalis ℥ii.— ℥i. horses, ii. to x mms. dogs.

BARIUM CHLORIDE—Injected intravenously or in solution by mouth—increases peristalsis from its stimulating effect on the muscular coat of the bowel—promptly producing evacuations which may be continued for some hours. It acts very quickly. There is danger in repeating, on account of risk of over action. Digitalin counteracts depressing effects. *Dose* by mouth. ½ to 2 drms., intravenously, 7 to 20 grs.

A useful and effective compound is found in one tablet of barium chloride et antim. tart. cum strychnia. (Willows, Francis and Butler.)

CALOMEL (Hydrarg. Subchlor.)—A good adjuvant cathartic, diuretic and excellent intestinal antiseptic, and it is fairly efficacious as a cheap vermicide. Very useful in obstinate cases of corneal opacity—a small quantity blown into the eye once daily, I have found, in most cases, to effect a cure. *Dose*, 1 drm. with 4 drm. aloes, as cathartic.

CORROSIVE SUBLIMATE (Hydrarg. Perchlor.)—One of the best antiseptics ; 1 in 20,000 kills most bacteria, and 1 in 10,000 most spores. A solution of 1 in 1000 is good as a wash for operator's hands and to field of operation, I have used a very dilute solution most successfully in catarrhal conjunctivitis and, from experimental use, think it beats all other collyria for this complaint.

CHLORAL HYDRATE—a sheet anchor drug—as a hypnotic and anodyne. It has a primary stimulant and secondary sedative action on the circulation and central nervous sytem, most useful as anti-spasmodic without interference with the peristalsis of the bowels, and can be given at the same time as a purgative. Is also a powerful antiseptic to the intestinal tract, and in consequence of its irritant properties should always be given well diluted. It is an antidote to strychnine, but the antagonism of strychnine to chloral is not so marked.

Atropine Sulphate is the safest antidote to chloral hydrate poisoning. It has a depressant action on the heart, which can be overcome by a hypodermic injection of strychnine.

Indicated in all cases of hysteria and delirium, quiets irritability and excitability. *Dose*, 1 oz. horse.

CHLOROFORM.—As a general anæsthetic, it still holds its place and requires no eulogy from me, as to the benefits derived by us from the uses and actions of this drug. A valuable accessory to our obstetric outfit, I am never without it : I have found it most beneficial in cases of malpresentations, where labour pains rather hinder than assist one in their work. I have found medicinal doses administered *per orem* in linseed oil, useful in dilating the *os uteri*.

COCAINE HCL.—For local anæsthesia I have found nothing more reliable, and in minor operations one dram of a 5 to 10 per cent. solution, injected into the seat of operation, gives satisfactory results ; and further, a similar quantity of the same percentage injected over the course of plantar nerves is very useful in the diagnosis of foot lameness.

CREOSOTE is still in great repute as a specific for dysentery and diarrhœa in calves. It is dispensed in a useful preparation Mist. Creosote Co. (W. F. B.). I have found it valuable in gastritis, and in muco-enteritis in calves and foals.

ESERINE.—An alkaloid obtained from the alcoholic extract of Calabar bean : used as a purgative. Stimulates all secretory glands, voluntary and involuntary muscles. In the treatment of intestinal obstruction and obstinate constipation, in virtue of its promptly and effectively relaxing the muscular fibres of the intestine, it is of practical value. *Dose*, 1 gr. Best used with pilocarpin, 2 grs.

FORMALDEHYDE or FORMIC ALDEHYDE, a preparation known under the trade name of Formalin, is understood to be strong solution of formaldehyde—a powerful germicide—a solution diluted with 200 parts of water kills most organisms. I can recommend it when painted with camel hair brush on malignant or indolent ulcers, for it induces a healthy healing action. Used internally in two dram doses, well diluted with water, I have found it useful in tympanites in cattle, and flatulent colic in horse.

GLYCERINUM BELLADONNA.—Green extract of belladonna 50, distilled water (boiling) 6·25 glycerin to 100 is useful in respiratory distress in cattle, given orally.

METHYL SALICYLAS.—Known also as artificial oil of wintergreen or sweet birch, is the methyl ester of salicylic acid. It is the linimentum methyl salicylatis co. B.P.C. of which I desire to speak. This is a compound liniment of methyl salicylate, and is composed of menthol 5, chloral hydras 5, extract of Indian hemp 0·5, essential oil of camphor 25, methyl salicylate to 100. I have found this liniment of great value in the treatment of painful joints, by painting the affected area and subsequently covering with flannel or gutta percha tissue. The cost of this preparation makes its use prohibited in general practice, but I recommend it for conditions where small quantities suffice.

NAPHTHALENE—A hydrocarbon obtained by the distillation of coal tar, and which is employed as an antiseptic, but some doubt has been expressed as to whether it has itself such properties or whether its antiseptic effects are due to the formation of naphthol. Naphthalene is used internally in putrefactive diarrhœa as an intestinal disinfectant. Naphthalene combined with ole. oliva, ole. terebinth and with nux vomica. Emulsio Naphthalene Co. (W. F. B.) has met with some success in treatment of Johnë's Disease, but I have just heard of a practitioner who claims that ol. lini 1 pint, with 4 oz. petrol is a specific.

NUX-VOMICA, another sheet anchor drug as a nerve tonic and invaluable in cattle practice. It possesses all the active properties of strychnine. Small to moderate doses promote secretion of saliva, improve appetite, increase gastro-intestinal movements, and hence assist in overcoming constipation. Prescribed with ammon. carb. at intervals of four hours, I have had excellent results with it, and as a general tonic, when combined with iron and quinine—Liquor Ferri. Quinine Co. (W. F. B.)—it is unequalled.

OLE-TEREBINTH, a useful old-fashioned agent, as a stimulant and antiseptic and a vermicide ; still held in high repute. Prescribed with 15 minims of oil of peppermint in cases of subacute and persistent tympany, results are often beneficial. But its actions are multiple. As an effective vermicide in equine practice and for intra-tracheal injections for calves—in 1 to 2 dram doses, with acid carbol, tinct. opii and chloroform, results have been satisfactory.

POTASSIUM and its medicinal compounds. Amongst these we find some useful drugs.

POTASSII BROMIDE.—Used for its action on the central nervous sytem. It depresses the physical functions, the motor area, the medulla and cord—all the cells being affected at same time—by direct action on the nerve cells. By lowering the activity of both motor and sensory cells, potass. bromide is of great service in controlling epilepsy, and in treatment of cerebral excitement, where this is great, and sleep is sought: may be combined with chloral hydrate.

POTASS. CHLORAS—an antiseptic, sialogogue and diuretic. It stimulates the salivary and buccal glands, soothes and heals aphthous eruptions and ulcerations of the mouth. It is rapidly absorbed and continuously eliminated by the salivary glands, mucous membranes and kidneys, while in catarrh, sore throat, as a soothing electuary, combined with camphor, belladonna extract and treacle it is useful—it thins the secretions and promotes expectoration. Large doses are actively poisonous. Methæmoglobin is set free in the blood serum, the red corpuscles are disintegrated, cyanosis resulting from deficient oxygenation of the blood.

POTASS. IODID.—Action closely resembles that of iodine, but is less powerful and devoid of local irritant action. Medicinal doses are antiseptic and deobstruent (removal of obstruction in the body) and diuretic. Used to promote absorption of morbid products in pleuritic and other serous effusions, enlarged glands, etc. I find it useful in actinomycosis, combined with iodine and ol. terebinth, applied with a stick spatula to the lesions of the tongue twice daily. Twenty years ago, I also saw good results with the intratracheal injections (Dieckerhoff Treatment) for purpura hæmorrhagica. Solution consists of 5 parts potassii iodid, one iodine, to 100 water.

POTASSI PERMANGANATE—a deodoriser—in virtue of its power of oxidation, I have found it of specific use applied in finely powdered form, with compression of a bandage, for reducing the superflous granulation tissue in wounds such as one finds in the region of a hock. In cases of snake bite, the salt, rubbed freely into the wound, and a weak solution injected round the site of puncture is of use.

On the other medicinal compounds : potass nitras, potassii hydrate (caustic potash), potass. bicarbonate, potass. acid tartar (cream of tartar), I need not dwell.

QUASSIA is a pure bitter tonic without astringency. It is employed to increase the appetite and hence to improve the condition of the gastric mucous membrane. On account of its freedom from tannin, it may be prescribed with salts of iron, for which infusion of quassia is a useful vehicle. *Dose*, horse and cattle ℥ii—℥iv. I have found it useful as an enema for destroying both ascarides and lumbrici in the rectum of horse. Inject a pint every second day of a solution 1 in 100 of cold water.

QUININE—an alkaloid derived from the cinchona bark—a bitter stomachic tonic, febrifuge; also a general protoplasmic poison, its beneficial effect here probably depending on its attacking and destroying pernicious micro-organisms. In horse and cattle practice, I favour the use of pulv. cinchona, which is a useful febrifuge, tonic and mild astringent, from the presence of tannin. Its action in reducing temperature is due to diminished heat production, not to augmented loss of heat. The lessened tissue destruction following its use is probably as important as the reduction of temperature. Combined with sodii hyposulph., ammon. carb. and nux. vomica, I think it is invaluable in troublesome cases of atonic indigestion, to check abnormal gastro-intestinal fermentation and counteract a relaxed condition of the bowels. It is also serviceable in cases of strangles, influenza and septic metritis.

Quinine Sulphate, the soluble salt of the alkaloid, I prefer to use in canine practice.

I desire to deal very briefly with the following drugs:—

SODIUM AND ITS MEDICINAL COMPOUNDS.—Sodium salts provide us with medicinal agents, having the following actions:—Antacids, alteratives, antidotes, antiseptics, cathartics, emetic, restorative and stomachics.

Sodii Bicarbonate.—Most serviceable in cases of atonic dyspepsia in young calves, in relieving indigestion and flatulence, when conjoined with aromatics. It is also an antidote to mineral poisoning.

Sodium Chloride.—An essential article of food for the maintenance of health. Moderate doses are restorative, stomachic; larger doses are cathartic and emetic, whilst in pigs and fowls it produces toxic effects, frequently with a fatal termination. Used externally for steeping or cleansing wounds, a 1 per cent. warm water solution stimulates the vitality of the parts.

Sodium Borate.—A useful antiseptic in aphthous and ulcerated conditions of the mouth. It also allays irritation and itching of the skin in cases of erythema, intertrigo and psoriasis.

Sodium Hyposulphite.—Another internal antiseptic and febrifuge of good service in cattle practice, to relieve acidity and flatulence in calves. Equal parts in medicinal doses: pul. sodii hyposulph. exsic., pot. nit. and cinchona, constitute an excellent antiseptic febrifuge compound in the treatment of strangles. Having little taste, this can be given in drinking water. Repeated several times a day. *Dose*, horse 2 to 4 drms. thrice daily.

Sodium Salicylas exerts marked antipyretic action. There is increased loss of heat, so that the temperature falls in spite of the augmented metabolism. It would appear to produce a specific effect in rheumatic affections, the mode of action in this respect being unknown. *Dose* 2 to 4 drms. thrice daily.

Gentlemen, this concludes my paper, and I have just to thank you for the exceedingly patient hearing that you have given to it.

Horse Power.

"With the close of the Shire Horse Society's Show at Islington, has occurred a general exodus from London of the important and prosperous class of farmers concerned in this particular branch of the agricultural industry. Considering the growing competition of mechanical transport, it is satisfactory to learn that they were able, as a body, to speak in cheerful terms of their experiences at the Show. Breeders, says our Agricultural Correspondent, are working steadily and successfully towards the ideal way they wish to attain—the combination of size, weight, limb development, action and soundness which is calculated to produce the finest class of powerful and enduring draught horses. As the result of the Show they were able to agree that, though the demand is discriminating rather than extensive, there are distinct signs of returning prosperity in their business. Whatever may be felt as to the desirability and likelihood of the eventual disappearance of ordinary horse traffic from the congested streets of London and other big cities, there is still, in town as well as in country, a demand for heavy horses of the great English cart-horse breed. In the country especially—because of the uneven, hilly, and sometimes rocky surface of the ground in many English, Scotch, and Welsh farms, and the general smallness of British fields—it is not likely that the mechanical tractors and power-driven machines, however useful in some districts, will ever entirely supersede the service of heavy horses. There are, therefore, sound grounds for the optimistic views expressed at the Shire Horse Show. On that point, the testimony given by Sir Bernard Greenwell, the retiring president, at the society's annual meeting, is definitely reassuring. He is quite satisfied that the end of the heavy horse is not in sight. The same, too, may be said of draught horses of a lighter type, the employment of which is practically indispensable in the milk and other similar trades, in which the door-to-door traffic involves constant stopping and restarting. On one aspect of light horse breeding—namely, the new responsibility placed upon the War Office for the production of transport animals—a well-informed Correspondent contributes an interesting article to our agricultural page today. The subject is rather outside the usual scope of that page; but it is of obvious national importance.

"The whole tendency of the age, as the country knows to its cost, is depopulation of the rural districts, and concentration, to the hurt of most of those who take part in it, in the towns. The type of breeders who flocked to London last week for the Show are a splendidly virile and intelligent section of the community. In times like these it is refreshing to find a class of workers who, instead of despairing of the prospects of the trade by which they make their livelihood, actually dare to be optimistic. Whether they concentrate solely on horse breeding, or combine it with the rotation work of ordinary farming, they cannot fail, in proportion as they are successful, to stimulate the prosperity of the country side both by the money which they make and circulate and by the employment which they give. They are, in fact, not only a wholesome element in the general life of the country, because they help to keep the people on the land, but an asset to its commercial stability and progress. The mechanicians have paid them

The Veterinary Record.

21st March, 1925.

THE MILK AND DAIRIES' ACTS.

When the Milk and Dairies' (Scotland) Bill became an Act by the will of Parliament in 1914, it was provided that the Act should become operative not later than the 1st October, 1915. It is well known that war conditions made it impossible effectively to operate the Act at that date, and that the Act was retained on the statute book until 1922 by means of special legislation which postponed its operation from year to year. In 1922, the Milk and Dairies' (Amendment) Act was passed, and it provided that the original measure should become operative on such date as might be determined by the Scottish Board of Health, but that the date must not be earlier than 1st September, 1925. In reply to a question addressed to him by the Earl of Dalkeith, the Secretary for Scotland, on the 5th March, informed Parliament that it was the intention of the Government to make the Milk and Dairies' (Scotland) Act, 1914, operative on the 1st September, 1925.

The Act is of great importance as a measure in the interests of Public Health, but, at the moment, we do not propose to discuss this aspect of the subject, nor to touch on its influence in relation to the Milk Industry. We give a very brief summary of the clauses more immediately affecting our members, from which the significance and importance of the statement made by the Secretary for Scotland will be appreciated.

Section 3 of the Act provides that each Local Authority may, and when required by the Board of Health, shall appoint one or more members of the Royal College of Veterinary Surgeons to act as Veterinary Inspectors under the Act, and shall pay to the Inspectors so appointed such salary as may be approved by the Board. A Veterinary Inspector appointed in terms of the Act will not be permitted to engage in private practice in any district in which he holds office, except with the consent of the Board. Two or more Local Authorities may, and, if required by the Board, shall combine in appointing a Veterinary Inspector. No Veterinary Inspector appointed by a Local Authority under the Act will be removable from office, except by, or with the consent of the Board. In districts where a Veterinary Inspector is not appointed in terms of this Section, the duties required to be performed by a Veterinary Inspector under the Act are to be performed by a Veterinary Surgeon approved by the Local Authority, in terms of Section 43 of the Public Health (Scotland) Act, 1897, for the inspection of meat and other foods. Appointments under the Act and the Diseases of Animals' Acts may be held conjointly. Local Authorities are instructed to regulate the duties of the Veterinary Inspector under the Act, and his relation to other officers of the Local Authority.

The further sections of the Act provide, *inter alia*, for the periodical inspection of all cattle in dairies; for special inspections when the milk consigned from a dairy is, in the opinion of the Medical Officer of Health, likely to cause infectious disease or other illness; for prohibiting, under penalty, the sale of the milk of any cow suffering from tuberculosis of the udder, tuberculosis with emaciation, from any sore on the teats accompanied by suppuration or bleeding, or from any cow which is giving tuberculous milk; for the stoppage of milk supplies from any dairy when the milk consigned therefrom is likely to be injurious to the consumer; for the collection, by the Veterinary Inspector, for the purposes of the Act, of samples of milk, secretions or discharges from individual cows; for the bacteriological examination of these materials; and subject to the previous consent, in writing, of the owner, for the application of the "tuberculin or other reasonable test," to any cow, for the purpose of discovering whether it is suffering from tuberculosis. Provision is also made whereby a Local Authority, which fails to perform any duty imposed on it by the Act, may be forced to meet its obligations.

The provisions of the Milk and Dairies' (Consolidation) Act, 1915, which is applicable to England and Wales, are similar in effect. An intimation was made on March 5th, that the English Act will also become operative on September 1st next, so that the two Acts will come into force simultaneously.

The statement of the Secretary for Scotland has a further significance. The Tuberculosis Order and the Milk and Dairies' Acts are complementary. Alone, neither can accomplish its full purpose in the public interest. Together, they provide the machinery for locating, and for eliminating the sources of human infection with bovine tuberculosis. The statement has been repeatedly made from official sources, that the Tuberculosis Order and the Milk and Dairies' Acts would be made simultaneously operative. This is so obviously necessary that any other course could scarcely be conceived. The statement of the Secretary for Scotland would, therefore, appear to imply that the Tuberculosis Order will be re-introduced during the current year.

The Council of the Association has repeatedly urged the appointment of Veterinary Officers on the staff of the Ministry of Health and of the Scottish Board of Health. The Milk and Dairies' Acts will result in a broader and still closer relationship than has hitherto existed between officials of the Ministry and Veterinary Inspectors of Local Authorities. With the operation of these Acts and the Tuberculosis Order, it will become more markedly desirable that such appointments should be made, and to this aspect of the question the Council will give close attention.

(*Continued from previous page.*)

the compliment of naming the unit of power after the animal with whose services it is their utilitarian object, as far as is possible, to dispense. Happily, it may be believed that not all the ingenuity of all the inventors will ever be able to eliminate altogether either the horse, with which the human race has through the ages supplemented its own manual power, or the type of men in this country who labour to preserve it from extinction."—*The Times.*

CLINICAL AND CASE REPORTS.

Tetanus.

By F. T. Harvey, F.R.C.V.S., St. Columb.

Mr. Taylor's note in "*The Record*," of March 7th, raises a point of interest. I recently saw a horse affected with tetanus. There was quite a small harness gall on the back, which I concluded had probably some connection with the attack. The horse had had a somewhat severe injury with a wound in July, 1923. The owner asked, "Is it caused by germs lurking in the tissues at the site of the old wound?" I said I preferred the harness gall, or some more recent infection. The possibility of such an occurrence, however, can by no means be ruled out. Sir David Bruce (1) quotes Dr. Goadby as follows:—"Tetanus bacilli may remain for long periods quiescent at the sites of old wounds, 786 days would not seem to be an impossible incubation period." Again, "Many cases (tetanus) had no evidence of any injury on their bodies. The explanation for this is that those patients had been injured weeks or months ago, but that the bacillus or spore implanted in the wound did not germinate into a number of bacilli with production of toxin for a very long period, though the wound healed up completely, until it found favourable condition for its growth. Hence the so-called idiopathic cases of tetanus." (2).

Although the limit of the normal incubation of tetanus may be fixed at about twenty-one days, it is certain that delayed tetanus occurs. It is then presumed that spores remain undestroyed in the tissues until they are in some way stimulated to germination.

Splanchnic Tetanus.

This form has been described as occurring in man following upon lesions of the viscera, or penetrating wounds of the abdomen or thorax. Opisthotonos and general convulsions do not occur, the spasms being limited to the muscles of deglutition and respiration. There is no trismus. I have seen one case of this type in the horse. There was stiffness of the hind legs and the tail was somewhat elevated, as in a mild case of tetanus. Any excitement, or the taking of food, seemed to determine severe spasm of the muscles of the thorax and abdomen. There was increased tonus of these muscles in the intervals between the seizures. Death occurred on the second day.

Tetanus is by no means common in cattle, but when it does occur there is some reason for regarding the splanchnic form as being not infrequent. The diagnosis of the disease in bovines is not quite so easy as in horses, and abdominal disturbance is a very marked feature. In whatever form the disease assumes, the heart muscle never passes into a state of tetanus. It is a most fortunate provision of nature, for otherwise we would get no recoveries.

References.

(1) Tetanus treated in Home Military Hospitals. Sir David Bruce.

(2) Analysis of one hundred consecutive cases of tetanus. N. A. Cooper. *Lancet*, Dec. 22nd, 1917.

Lymphangitis, followed by Suppuration, treated with Autogenous Vaccines.

By. C. J. Peach, M.R.C.V.S., Clifton, Ashbourne.

Subject.—A Shire five years old mare.

History.—On December 18th I was called to see this case, which was affected with lymphangitis on the near hind leg. The disease had been in progress for three or four days. The animal was very lame and the swelling was great.

Treatment.—A physic ball was given and hot fomentations to the leg ordered. On December 4th the swelling had gone down well, but the fetlock and metatarsal region were much swollen.

At this date the fomentation was discontinued, exercise was ordered and the patient placed on a course of biniodide of mercury and potassium iodide.

On December 8th the swelling was about the same, but there were signs of abscess formation at the antero-external aspect of the fetlock. By December 12th the abscess had burst, the top sloughing away, leaving an angry suppurating wound the size of half a crown and about ¾ to 1 inch deep.

On December 13th, the wound showing no signs of healing (although antiseptic treatment had been carried out) and the thickening of the leg still remaining, I took a swab and sent it to Mr. Scott, F.R.C.V.S., Bridgwater, who reported the presence of the following organisms: *streptococcus brevis*; *staphylococcus albus*; *diplococcus.*

On the 19th the mare had the first dose of vaccine, while the local treatment consisted of Beir's application (which was repeated every six days), and soaking the limb in a solution of sod. cit., sod. chlor. and lysol.

December 25th: Swelling unaltered, but the wound looked more healthy.

December 30th: The wound was healing well and the local swelling was slightly less.

January 4th: The wound was almost healed and the thickening was much less. The fourth dose of vaccine was given.

On January 19th the patient had the last dose of vaccine and the limb had regained its normal size.

Conclusions.—This case did not appear to respond to the ordinary line of treatment and, the mare being a valuable one, I was desirous of guarding against the risk of septic infection and a permanent thickening of the joint. I therefore considered vaccine therapy advisable, and the manner in which the case responded to the treatment, was, to me, satisfactory.

Lead Poisoning in Geese.

By S. E Sampson, Sheffield.

During the preparation of a shooting box on the edge of the moors for the "Glorious Twelfth of August," last year, the decorators were removing coats of white paint from the woodwork before putting on the new paint. The scrapings were thrown out on to grass close by and a flock of goslings had access

(Continued at foot of first column next page.)

DIVISIONAL REPORTS.

Midland Counties' Division.

ANNUAL MEETING AT BIRMINGHAM.

The Annual Meeting of the Midland Counties' Division was held at the Grand Hotel, Birmingham, on Friday, February 13th, the President (Mr. L. W. Heelis, of Solihull) occupying the chair. There were also present: Messrs. J. T. Allen (President Lancashire Division), Brooke, Gooch, Cormack, Tipper, Slipper, Pemberton, Forsyth, J. Martin, T. Martin, Woodward, Somer, Powley, Palmer, Powell, Steele-Bodger, McKenzie, Murray, Ison, Aston, Conchie, White, Scott, DeVine, Young, H. W. Dawes, Gold, Green, Woodward, Marriott and the Hon. Secretary, Mr. H. J. Dawes. Among a large number of distinguished visitors who attended were: Messrs. S. H. Slocock (President R.C.V.S.), G. Abson (Treasurer, R.C.V.S.), W. S. King (member of Council, R.C.V.S.), Percy Simpson (President, Central V.M.A.), G. H. Livesey (Secretary, National V.M.A.), C. O. Langley (Solicitor, National V.M.A.), J. Scott Bowden (Colwell), and Allen, junr.

Apologies.—Sir John McFadyean, Sir Stewart Stockman, Sir Gilbert Barling, Professors Penberthy and McQueen, Messrs. Hobday, Anthony, Burchnall, Ringer, Parke, McGregor, Prudames, Lake, Phillips, Blackwell, Findlay, Furness, Carless, Barratt, Elder, Watts, Heather, Tailby, Maguire, Taylor, Barker, Dale, West, Steward, Forwell, Baxter, Hart, Adams, Forsyth, Reynolds, Codrington, Fairbank, Byner, Brain, Franklin, Green, Hobson, Connell, Hughes, Hiles, Cockburn, Over, McLauchlan, Parsons and others.

New Members and Nominations.—The MINUTES of the previous meeting having been confirmed, nominations for membership of the Division were invited, and the following were received: Messrs. C. G. Allen and H. B. Allan, of the City of Birmingham Veterinary Department, and Mr. J. Scott Bowden, of Colwall.

The following were elected members: Mr. Lindsay Auchterlonie (Nottingham); Mr. John Scott (Leamington) and Mr. Thomas H. Mickie (Worcester).

Fees for Dog Shows.—The Hon. Secretary read a letter from the National Association inviting consideration of a resolution passed by the Western Counties Division to the effect that the time had arrived when veterinary surgeons should be paid an adequate fee for their attendance at dog shows.

Mr. LIVESEY said that the action taken so far at divisional meetings had been in favour of supporting the resolution, but the feeling seemed to be that, if fees were charged, it should only be at championship shows and not at small local shows. Three associations had decided to let the matter lie on the table and to take no action.

Mr. MARTIN said those veterinary surgeons who were interested in dogs would not agree to any hard and fast rule.

Mr. CORMACK agreed that in the case of local shows veterinary surgeons like to be associated with them, not so much with the idea of drawing a small fee, as to make themselves known among "doggy" people. A dog championship show was another thing, and he moved the following resolution: "That in the case of the smaller local dog shows, no action be taken, but in the case of the larger shows, viz., championship shows, where the veterinary surgeon was required to be in attendance for a day or more, suitable remuneration should be received."

Mr. TIPPER seconded the motion, which was carried.

Veterinary Research.—A letter was read from the "National," enclosing copies of the resolutions in the name of Major General Sir John Moore, which had been adopted by the Central Division, advocating the creation of a Veterinary Research Council, "adequately to meet the demands of the veterinary profession and the community in general for the better elucidation of animal diseases and their consequent proper scientific control." These resolutions have already been published in the *Record*, and the Midland Division was asked to support them.

There was a suggestion that the matter should be deferred, but

Mr. ASTON said everyone must have read the resolutions in the *Record* and he could not imagine anyone objecting to them. He proposed that this Association give them the heartiest support.

Mr. CORMACK seconded and this was unanimously agreed to.

Royal Sanitary Institute.—A letter was read from the Royal Sanitary Institute inviting the Division to be represented at the next Annual Congress, to be held at Edinburgh, from July 20 to July 25.

On the motion of Mr. Powell, it was resolved to follow the usual practice and request the President to represent the Association on the occasion in question.

The HON. SECRETARY reported that he had received from Mrs. Coe, widow of Major Coe, an old and respected member of that Division, a parcel containing the instruments he used in his practice, with a request that he would dispose of them among the members and apply the proceeds to the Victoria Benevolent Fund.

TREASURER'S REPORT.

The HON. TREASURER (Mr. W. H. Brooke), presented his annual statement of accounts. This showed a total on the assets side of £203, including £85 brought forward and £67 subscriptions. The expenses totalled £95, leaving a balance in hand of £107.

(*Continued from previous page.*)

to them and were seen picking them up. I was asked to investigate the cause of the deaths of five which succumbed, while two were ill, eventually dying. Others were off food, but recovered, after having acute diarrhœa.

The *post-mortem* disclosures were all alike, revealing petechial patches in the intestines and muco-enteritis. In my view the trouble was due to lead poisoning.

On the motion of Mr. GOOCH, one of the auditors, seconded by Mr. SLIPPER, the accounts were passed and the treasurer was instructed to supplement the annual subscription of five guineas to the Victoria Benevolent Fund with a donation of £5, as was done last year.

Mr. STEELE-BODGER produced a receipt for £35, being the amount collected from the members of the Association towards the Royal (Dick) College Centenary Fund.

Resignations: The HON. TREASURER reported two resignations, namely, those of Mr. F. B. O. Taylor, who has left the Midlands for a practice in the Eastern Counties, and Mr. Elder, of Tewkesbury, who is prevented by illness from continuing to follow his profession.

These resignations were accepted with regret, and in the case of Mr. Elder, the Hon. Secretary was instructed to forward to him, in the name of the Division, a message of sincere sympathy.

The Hon. Treasurer was instructed to erase from the list of members the names of those whose subscriptions were seriously in arrears.

ELECTION OF OFFICERS.

The report of the Council of the Division, who met earlier in the day, was submitted. In this, the following recommendations were made: That Mr. T. Slipper, as senior vice-president, be elected President of the Association for the ensuing year; that the vice-presidents be Messrs. L. W. Heelis (the retiring President), S. M. Woodward and J. O. Powley; that Mr. W. H. Brooke be re-elected Hon. Treasurer; that Mr. H. J. Dawes be re-elected Hon. Secretary; that Messrs. Gooch, Tudor Hughes and Cormack be appointed auditors; and that the Council for the ensuing year consist of the following: Messrs. R. C. Trigger, R. Hughes, J. W. Conchie, J. T. Allen, T. H. Hobson, W. F. Aston and R. Palmer, together with the officers of the Association.

It was further recommended that the next quarterly meeting be held at Shrewsbury. Mr. F. F. Somers had kindly promised to open a discussion on the new Meat Regulations of the Ministry of Health.

On the motion of Mr. ISON, seconded by Mr. TIPPER, the Council's report, with the recommendations therein, was adopted.

The various officers and council, as above recommended, were then formally appointed.

The thanks of the Division were heartily accorded to all for their past services.

VETERINARY INSPECTORS' FEES.

Mr. LIVESEY initiated a discussion on the subject of veterinary inspectors' fees. He said there were a few facts which he hoped to lay before the meeting to show the necessity of veterinary surgeons agreeing among themselves as to what they considered adequate remuneration for their duties as local inspectors. It was a question that had been agitating a certain branch of the profession for many years. In 1911, Mr. Theodore Toope, of Dover, took the matter up very strongly. and he endeavoured to draw up some scale that would be generally acceptable. He wrote a pamphlet in 1913, drawing attention to the inadequate fees that were paid in certain localities. In one county the payment was 5s. per day with mileage, but no payment was to exceed 15s. per day. In some places in Scotland there were some bad cases. In one, payment was 10s. 6d. a day with travelling one way, 2s. 6d. for anthrax and 1s. 6d. for subsequent visits. The next step was taken by the National Association of Veterinary Inspectors, whose efforts were baulked by the outbreak of war. A scale was drawn up covering most of the work that was done, except one or two small items. Since the National Veterinary Association took this matter up, he had been in communication with veterinary inspectors all over the country, and with county councils and other local bodies, but he had found it very difficult to obtain the information he wanted except from certain districts. From such information as he had received, he had drawn up a table of the results which had been circulated. It represented the payment of some 50 local authorities and if they studied the average payments, they would get some guide as to what fees they might think well to adopt. It was the low fees in many districts that made the average so low. In Wales, they had one of the best paid and one of the worst paid districts alongside each other. Mr. Livesey gave details of the fees paid. In another district such low fees were paid that veterinary inspectors refused to accept them, although they did the work. Such low fees, they thought, were derogatory to them. A certain county in England paid 10s. 6d. for market inspection up to three hours, and in this county there was the insulting condition that for attending anthrax and making a microscopical examination, the payment should be 10s. 6d., with an extra 10s. 6d. *if the diagnosis was confirmed*. Two years ago a strong Departmental Committee was formed to inquire into foot-and-mouth disease and it had been the means of helping them to get the salaries of inspectors at the Ministry of Agriculture increased. The Committee issued a comprehensive report, published as a Parliamentary Paper, in 1922, recommending that small local authorities should club together for whole-time veterinary officers. In their report, they said the salaries paid to part-time inspectors was so absurdly inadequate as to make a proper inspection more than could be expected. There was no doubt some local men had managed to get good appointments, due to the individuality of the men themselves. He knew of one case in which a man got £26 a year for an examination of markets, and another got £226 for doing similar work. He suggested some agreement on what they believed to be just and fair as a *minimum* scale, but not to put the figures too high, especially in the item of mileage, because they were not likely to get a high mileage rate. There was a danger in asking too much. Several counties at the present time were paying very good fees. Instead of putting forward a standard scale, he advised that they prepare a *minimum* scale, bringing it to the notice of those authorities that paid inadequately and leaving those alone whose present scales of fees were considered

satisfactory. It was difficult, too, to try and establish a standard mileage. The average throughout the country amounted to about 6½d. A corporation would not pay the veterinary surgeon 9d. if the borough engineer was only getting 6d. Let the mileage be the same as was paid to other municipal officers.

An interesting discussion took place on the subject, at the conclusion of which a list of fees for Veterinary Inspectors was unanimously adopted for submission to the National Veterinary Association.

A vote of thanks was accorded to Mr. Livesey for the manner in which he had brought the matter forward.

A broken Scapula.—Mr. FORSYTH produced for inpection a broken scapula, found in a case of fistulous withers, the discharge coming out lower down the arm.

Non-slip Shoes.—Col. MARRIOTT brought for inspection an anti-slip shoe of his own design, and invited criticism and suggestion. It is to be made in malleable iron and has a rubber ring inside. The rubber, he admitted, was rather to prevent concussion than to guard against slipping.

The meeting shortly afterwards terminated.

THE ANNUAL DINNER.

Subsequently, the Annual Dinner was held, Mr. Heelis again presiding, and a brief toast list followed, headed by "The King."

Mr. LANGLEY gave "The Royal College of Veterinary Surgeons," and said it was a pleasure to be able to couple with the toast the names of two of the oldest members of the Council: Mr. Slocock, the President, with sixteen years' service to his credit, and Mr. Abson, the Treasurer, who was on the Council over thirty years. He spoke as an official of the National and as one who had only recently joined their ranks, but he had already discovered that, although the College existed largely for discipline, it occupied an important position educationally. The Council strove in every way to enhance the prestige and well-being of the profession, and in that respect he thought it succeeded very well.

Mr. Slocock, in reply, said that of the thirty-two men who had formed the Council, there was not one who had not the best interests of the profession knowingly at heart. They came from all parts of the country at no small cost to themselves, to carry out the work of the College. Certain complaints had been made concerning the constitution of the Council. It was said there were too many teachers or too many London men. He could only say that the teachers were amongst their most valued members and they were most in touch with the aims and aspirations of the younger generation of veterinary surgeons. As for the London men on the Council, he considered they were necessary for this reason, that they could not expect country practitioners to come up to town for every little meeting that was summoned, and he could assure them that some of the meetings were very formal, but the principal gatherings at which the real business of the Council was done were always well attended. The work was done in a broad spirit, and with no other object than the best interests of the profession. There were many ways in which the profession could help the College, and there was none more satisfactory than the suggestions put forward by district associations such as that. They had unpleasant duties to perform sometimes, of which the investigation of complaints was one, but the Council faced them fearlessly, and, he believed, honestly. As for the educational side of their work, the Council exacted a certain standard of education from all students who presented themselves for examination, which was the best guarantee to the public that a veterinary surgeon was fully qualified to practice the science of veterinary medicine and surgery. Those examinations were a blessed feature of the one portal system which was a great safeguard of the profession, and that system it was the Council's intention jealously to uphold.

Mr. ABSON, who also acknowledged the toast, said that, as the profession's chancellor of the exchequer, he was afraid he would have to pull the purse strings a little tighter if they were to make ends meet. Their income from students was not likely to increase in the future, but rather to diminish. Incidentally, he mentioned that it was through the instrumentality of two members of the Midland Association, Mr. R. C. Trigger and the late Mr. John Malcolm, whom he entertained when the National met at Doncaster thirty years ago, that he became associated with the administration of the affairs of the Royal College of Veterinary Surgeons.

Mr. LIVESEY proposed "Prosperity to the Midland Veterinary Medical Association." He said it was the first Association with which he ever came in contact, and it was then that he met Mr. Dawes, who for a very long period had made the welfare of the Association one of his chief objects in life. One never thought of the Midlands without thinking of Mr. Dawes, and they were extremely lucky to have such a man to direct their affairs. The Midland was not the largest Association nor was it the oldest, but in both respects it held a very good place. The Central was the largest Division with nearly 200 members, but the Midland had a membership of 140, and Lancashire was following closely on their heels. He congratulated the Midland Association on its continued vitality, and he knew of no association in the country which had such a quantity of excellent clinical material brought forward, or which could sustain a keener discussion. He coupled with the toast the three chief executive officers—the President, the Hon. Secretary, and the Hon. Treasurer.

Mr. HEELIS, Mr. BROOKE, and Mr. DAWES all suitably replied, the two first named paying willing tribute to the work on behalf of the Association done by Mr. Dawes. The last named gentleman, comparing the Midland Association with the Central, said that some members of the Midland lived 50 miles apart, yet the meetings were invariably well attended. It was a remarkable fact, added Mr. Dawes, that the members who lived farthest away, were the most regular in their attendance. The Midland Association was his hobby, and he was proud to think that it occupied such a leading position in the Councils of the profession.

The concluding toast was that of "The Visitors," submitted in felicitous terms by Mr. B. DeVine, and suitably acknowledged by Mr. W. S. King and Mr. Simpson, both of whom thanked the Association for the warm hospitality extended to them.

H. J. Dawes, *Hon. Secretary.*

North of Scotland Division.*

The half-yearly meeting of this Division was held in Marischal College, Aberdeen, on Saturday, January 31st, 1925.

Mr. H. W. Robson (Laurencekirk) presided, and there were also present Messrs. Anderson, Cumming, Crabb, Clerk, Drennan, Forrest, Hepburn, Howie, Ironside, Kerr, Lyon, Murray, McAllan, McVean, Niven, Sievwright, Wallace, and Forbes.

Visitors.—Messrs. A. Gofton (President, N.V.M.A.) and W. Jackson Young (Ministry of Agriculture).

Apologies.—Messrs. Inglis, J. Brown and W. Brown.

New Members.—Messrs. Rutherford (Brechin), Rice (Montrose), Ironside and Forbes.

Correspondence.—Letters from the Western Counties Division, and the Secretary, N.V.M.A., *re* fees for attendance at dog shows. It was agreed that, as far as that Division was concerned, no action be taken.

Two letters referring to Veterinary Inspectors' Fees under the Diseases of Animals Acts—from the General Secretary, N.V.M.A.—The Secretary was instructed to inform Mr. Livesey that the scale of fees in the north-eastern area of Scotland had only recently been readjusted, and that the members were unwilling to reopen the question with the County Councils—the fees paid, though not according to the maximum scale, being regarded as satisfactory.

The resolution regarding the creation of a Veterinary Research Council, proposed by Sir John Moore at a meeting of the Central Division and forwarded by the General Secretary, N.V.M.A., was read and discussed. It was agreed to give this proposal the warmest support of the Division without suggesting any alteration of the terms of the resolution.

Sanitary Congress at Edinburgh.—Mr. G. Howie, Alford, was appointed to attend the Congress as the delegate of the Division; Congress fees and rail fares to be paid.

President's Inaugural Address.

The President, Mr. H. W. Robson, then delivered his inaugural address. In the course of his remarks, the President expressed thanks for his election to office. He must confess that the least of all his ambitions was honour, and, though he could say without much fear of contradiction that any honour that had fallen to his lot during his professional or private life had not been of his own seeking, he had an ambition, and it was to do, to the best of his ability, anything that would have a tendency at any time to help on the good work of the profession. (Hear, hear.)

He had been a member of the Veterinary Profession for over a quarter of a century and during that time the profession had made wonderful strides towards the goal of its ambition, but he felt he must come to the conclusion that it had not yet taken its proper place or position among the great scientific professions of the world. Education, no doubt, had played an important part in the progress made, but there were other circumstances that had also played their part in helping to raise the status of the profession. The outbreak of the Great War did its part. It showed to a considerable degree the willing work and self-sacrifice and the capabilities of each member of the profession in coping with emergencies in the treatment of the vast number of animals at home and abroad. It had shown to the British people that the Veterinary Profession were prepared to sacrifice their all and give of their best, with other professions, to help to "keep the home fires burning," and their worth had been recognised by His Majesty in the adding of the word Royal to the title of the Army Veterinary Corps.

They were delighted to see the President of their Association, Professor Gofton, present with them at their meeting. He had known Professor Gofton for a great number of years and knew that he had always taken a very great interest in his profession, in the "National" and its branches, and in the welfare of its individual members. He had always found Professor Gofton to give advice in the soundest possible way. The "National" had done a great deal to place the profession on a sounder basis. He thought the meetings such as they witnessed in Aberdeen only a few months ago, both business and social, had in themselves been a power for good in helping to raise to a higher and nobler level. He had often thought, since the "National" met in Aberdeen, that if they could always be as friendly, amiable and sociable, and ready to help each other as they seemed to be during the "National" week, their profession would rise much more rapidly, and they would the more quickly gain the confidence of the country at large and of the agricultural community in particular. It had been said that agriculture was the backbone of the British Empire. He had no reason to deny that statement. The farmers were generally very quick to notice their shortcomings and were equally slow to give them credit for the good work they had carried out in safeguarding farm stock from disease. It behoved the Veterinary Profession to try to show the farmers by their labours that it was one of their greatest assets. It was their duty to try to convince and make agriculturists realise that it was the Veterinary Profession, and it alone, that had practically stamped out foot-and-mouth disease, despite the cry of non-slaughter. They should try to make the community realise that it was the Veterinary Profession, and it alone, that, in some not far distant day, was going to eradicate tuberculosis from dairy herds, so that the children could drink milk with impunity. It was a sad matter to see, as they went to and fro over the land, so many

* Received on February 10th.

children with the lymphatic glands of the neck and throat removed owing to infection caused by drinking milk. It was time that the profession was up and doing to bring, through the "National," their views home to the authorities, that powers to deal with this should be given to the Veterinary Profession, for it was they alone who would be able to banish the scourge that was sapping the energy and health of the rising generation. They must get such powers as would enable them to deal with tuberculous animals, which should not be allowed to give milk for sale to the community. There was another important question. namely, that of animal nutrition. He thought that should belong and belong entirely, to the Veterinary Profession. But what did they see to-day? They saw that the question, in many cases, was taken out of their hands and investigated by men who were entirely outside the Veterinary Profession. He thought that was a great detriment to veterinary science. The "National" should do their best to convince the Government that it was high time that tuberculin should not be sold broadcast, because he was convinced that cattle tested by the veterinary surgeon would never be wholly satisfactory until the use of tuberculin was controlled.

He did hope that each individual member of their profession, and the profession as a whole, would show, by their work and actions, to the community at large that they were entitled to respect and confidence, for until then, they would never reach the summit they desired. If they had the people of the country at their back, it would be the first thing that would convince the Government that the Veterinary Profession was to be one of the foremost in the country, and the Government would then give them necessary assistance in research and other matters.

Mr. W. HEPBURN, F.R.C.V.S., then presented a paper on "A Clinical Survey of Transit Fever in Bovines." This paper, and the discussion which followed, appeared in the *Record* of last week.

As a result of the discussion on Mr. Hepburn's paper it was unanimously agreed that the President, Secretary and Mr. Hepburn be appointed as a deputation to meet and confer with the Aberdeenshire County Executive of the Farmers' Union in order that a joint representation might be forwarded to the Animal Diseases Research Association urging the necessity of a thorough investigation into the cause of "Transit Fever" and, as a result, the suggestion of measures for its prevention.

The Secretary intimated that under the new Public Health, Scotland (Meat), Order, almost every veterinary surgeon was now a meat inspector. In view of this, he had asked Mr. McAllan to give the members a demonstration in meat inspection at the slaughter-houses at the next meeting in August. Mr. McAllan, as usual, had kindly agreed to do what he could for the members.

Professor Gofton expressed his pleasure at returning to visit Aberdeen, where in September they had done him the honour of appointing him President of the "National." From the series of interesting and successful meetings which they had during the Aberdeen Conference week, nothing could be of greater benefit to them as a profession. Aberdeen had a great deal to be proud of, having established a record in connection with their meetings, a record which he did not think would ever be equalled. At some of the social functions the number of those present doubled the numbers which were ever present at any similar functions previously held. It said much for the social, as well as for the scientific, side of their programme, and for the work which the local committee did, that they had been able to record such a successful conference in Aberdeen.

A vote of thanks to the President brought a most excellent meeting to a close. The members thereafter lunched together.

GEORGE HOWIE, *Hon. Secretary.*

West of Scotland and Ayrshire Divisions.*

A joint meeting of these Divisions of the N.V.M.A. was held in the Ayrshire and Galloway Hotel, Ayr, on October 9th, 1924.

Mr. George Scade, President of the Ayrshire Association, occupied the chair, and the other gentlemen present were Messrs. Begg (President of the West of Scotland Division), Mitchell, McFarlane, Roy, Weir, Campbell, Smith, Douglas, Gillmor, McGregor, McKenzie, Forbes, Laird, Gardner, W. J. Young (Board of Agriculture), and Brown (Hon. Secretary).

Mr. W. Gardner, M.R.C.V.S. (Maybole) read a paper, the subject of which was "A few Drugs—their Uses and Actions in Veterinary Practice." (This paper is published elsewhere in this issue.)

A number of those present took part in the discussion which followed, including Messrs. Scade, Begg, Forbes, Weir, Mitchell, and Young, who makes a special study of this subject. All complimented the writer of the paper.

The company were entertained to tea by the Ayrshire Association, following which a general discussion took place on various topics, one being the subject of amalgamation of the two associations. Mr. Begg and Mr. Weir, of the West of Scotland Association, put forward a strong plea for amalgamation which was favourably received by different members of the Ayrshire Division. After the departure of the Glasgow contingent the Ayrshire practitioners continued the discussion. It was decided that the Ayrshire Association should continue as a separate association in the meantime, and the Secretary was instructed to apply to the N.V.M.A. for affiliation. This being the annual meeting, the Financial Statement was read and adopted and the office-bearers were re-elected for another year.

The Secretary was instructed to ask Dr. Whitehouse, Principal of the Glasgow College, to give a demonstration or paper at the next meeting to be held in January.

This concluded a very interesting and instructive meeting. DAVID BROWN, Hon. Secretary.

* Received on February 10th, 1925.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest in these columns.

Diary of Events.

Mar. 25th—Meeting of the Comparative Section of the Royal Society of Medicine at 1 Wimpole Street, W.
April 1st—Annual Fee of £1 1s. 0d. due to R.C.V.S.
„ 2nd—R.C.V.S. Committee Meetings: Examination 11 a.m., Registration 2 p.m., Parliamentary 4 p.m., Special Sub-Committees Meetings.
„ 3rd—R.C.V.S. Committee Meetings: Library 11 a.m., Finance 12 noon.
Council Meeting 2 p.m.
May 7th—Last day for Nominations for election to Council R.C.V.S.
„ 21st—R.C.V.S. Voting Papers and Annual Report issued.
„ 28th—R.C.V.S. Voting Papers to be returned.
June 4th—R.C.V.S. Annual General Meeting. Earl Haig to attend to receive Diploma of Honorary Associate.

A Bovine Tuberculosis Measure.

In the House of Commons on Monday, Captain Hacking, Vice-Chamberlain of the Household, replying on behalf of the Minister of Agriculture to Mr. Hurd, said: My right hon. friend has at present under consideration means for the elimination of bovine tuberculosis, and he is proposing to introduce shortly a measure on the lines of the Tuberculosis Order of 1914, which is a necessary first step in any procedure of the kind.

Milk and Dairies' Act, 1915.

In the House of Commons on Monday last, Mr. Barnes asked the Minister of Health whether, in view of his decision to allow the Milk and Dairies'Act, 1915, to become operative from the 5th September next, he would state if those provisions of the Act which would be administered by order of the Minister would all be enforced on that date and, if so, whether he would publish drafts of the orders at an early date and arrange for consultation with the interests concerned before submitting the draft orders to Parliament.

Answer.—Sir Kingsley Wood: "My right hon. friend is unable at present to say on what date the orders to be made in pursuance of the Milk and Dairies' Act, 1915 will come into operation, but, as the right hon. member is no doubt aware, until the new orders are made the existing orders will continue in force. It is certainly the intention of my hon. friend to consult the interests concerned before any new orders are laid before Parliament."—*Hansard*, Oral Answers, March 17th, 1925.

Foot-and-Mouth Disease in Isle of Wight.

An outbreak of foot-and-mouth disease at Lower Watchingwell Farm, Calbourne, Isle of Wight, was confirmed on Saturday morning last by a veterinary inspector of the Ministry of Agriculture. The outbreak occurred in a valuable herd of pure-bred Guernsey dairy cattle, and the immediate slaughter of the whole herd of over forty, as well as of forty pigs on the farm was decided upon. No animals have been moved to or from the farm lately, but foreign cake and meal have been used in feeding.

In consequence of the outbreak, the Isle of Wight has been declared an infected area, and all movement of cattle in, or to and from, the island has been prohibited. The weekly cattle market at Newport is automatically closed and all hunting is stopped.

The last outbreak occurred in the Isle of Wight five years ago and involved the slaughter of over a thousand animals, chiefly dairy cattle, owing to the fact that the disease had spread to several farms before it was detected. It is hoped that the prompt discovery of the present outbreak will mean its speedy extermination.

Lamb Disease: Deputation to the Ministry.

At a meeting of the Diseases of Animals Sub-Committee of the Northumberland Agricultural Society on March 12th, the urgency of the continuation of the field research work into lamb disease and the necessity for the publication of a report of the results of previous years' investigations were discussed.

Owing to the need for a definite decision with regard to these two questions it was decided to appoint a deputation to interview the Minister of Agriculture and Sir Stewart Stockman upon these two important points, and it is hoped, as a result of their interview, that both these difficulties will be overcome.

Royal College of Veterinary Surgeons.

Obituary.

Jones, C., M.R.C.V.S., 4 Herbert Street, Dublin. Graduated Edinburgh, April 19th, 1883. Died March 14th, 1925.

Army Veterinary Service.

Waziristan Campaign Honours.

The following names appear amongst those who have been brought to notice for distinguished service during the operations in Waziristan, April 21st, 1923, to March 31st, 1924, by General Lord Rawlinson, G.C.B., G.C.S.I., G.C.V.O., K.C.M.G., Commander-in-Chief in India, in the Despatch dated June 11th, 1924 (published in the Supplement to the *London Gazette* dated November 18th, 1924):

Commands and Staff.—Aitken, Maj. and Bt. Lt.-Col. J. J., C.M.G., D.S.O., O.B.E., R.A.V.C.
R.A.V.C.—Hughes, Capt. H. J., M.B.E.

Indian Army Veterinary Corps.—Ali Muhammad, Risaldar: Ghazenfar Ali, Bahadur, 1st. Cl., Vet. Asst.: Muhammad Suleman Khan, No. V1108, 1st Cl., Vet. Asst.

* * * *

London Gazette—War Office—Regular Forces.
Capt. R. B. Crichton resigns his commn. (March 4).

CORRESPONDENCE.

Liver Fluke in North Wales.

To the Editor of The Veterinary Record.

Sir,—*Re* Mr. Howel V. Hughes' letter in your last issue, I wish to state that in response to an invitation from the Branch Secretary, extended also, I believe, to other local practitioners, I attended the Rhyl N.F.U. meeting addressed by Mr. Montgomerie.

During the address prices were certainly mentioned, essentially to compare the cost of treatment with male fern with that of a proprietary preparation and to show that sheep could be treated on a large scale without what the farmer would consider excessive expenditure.

Though Mr. Montgomerie mentioned the net price to veterinary surgeons of the preparation used, he added, what the Press has evidently omitted, "that in addition, veterinary surgeons' fees and overhead charges must also be reckoned and while not committing himself in this respect, he thought a charge of 1s. 6d. per head for medicine and supervising administration would be fair and reasonable."

He did not advise farmers to treat their own sheep, nor did he mention the name of the agents from whom the extract used was obtained.

On the contrary, he did advise farmers to consult their veterinary surgeons.

In justice to Mr. Montgomerie, these facts should be known.

In my opinion, his lecture has done much good within this area which suffered severe losses in the last fluke outbreak.—Yours faithfully, C. W. Cartwright.

Llyswern, Dyserth, Flints,
March 3rd, 1925.

To the Editor of The Veterinary Record.

Sir,—Mr. Howel V. Hughes, in his letter published in your issue of the 25th of February gives, in my opinion, an entirely wrong impression of the work and methods of the Veterinary Advisory Officer stationed at the University College of North Wales, Bangor. Since Mr. Montgomerie has been particularly active within the district in which I practice—more active, I should think, than in any other portion of his area—I have had a good opportunity of observing his methods and following his work.

Mr. Hughes' letter would give the impression that the practitioners in North Wales were able to successfully employ male fern in the treatment of liver rot before the research carried out at Bangor was commenced. That is not so, at least, in my case. So far as I am aware, no veterinary surgeon in this neighbourhood had success in the use of ordinary extract of male fern. The results of the Bangor investigation were privately circulated, and, following the lines they suggested, I have been able to save the many sheep I have since treated.

The type of advice Mr. Montgomerie has given to my clients has been such that I could ask for nothing better. He has filled a difficult position, during a serious time, for the North Wales agriculturist, in a creditable manner.

In the face of great urgency he has not spared himself in conducting a piece of work of very definite value, from professional as well as from other points of view, to Anglesey practitioners.

As I view his work of the past months, he has merited the co-operation promised at the meeting of the North Wales Division last March. Yours faithfully, Hugh Williams, M.R.C.V.S., TyCroes, Anglesey.

March 11th, 1925.

Distemper.

To the Editor of The Veterinary Record.

Sir,—Mr. W. M. Scott has, I am pleased to see, opened, or rather re-opened, discussion on this important subject, and his brief summary of the opinions expressed at Aberdeen and his comments thereon provide serious food for thought.

I join issue with Mr. Scott in hoping that others will express their views, for our ignorance of this condition is not a matter which can be lightly dealt with.

Canine distemper is possibly the most baffling disease the veterinary surgeon is called upon to treat or diagnose.

Our best authorities on the subject differ considerably in regard to the symptoms which dogs suffering from distemper evince. This, to my mind, clearly demonstrates the baffling nature of the disease, for most of those who have so expressed their views are keen and observant men with infinite experience.

Mr. Livesey, as quoted by Mr. Scott, holds "that oral infection is the order of things, and perhaps he is right." I do not agree with this view, but tend to the belief of Mr. Scott and Capt. Kirk that inhalation is a much more common method of transference.

I think it is fairly well known that it is quite easy to transmit distemper from an infective animal to a normal susceptible one without actual contact, either between the animals themselves or their bedding, excreta, or food material.

Mr. Scott states: "For the fatal issues following distemper one must credit the bacterial flora belonging to the secondary infections, and if we could take our patients in hand at the first rigor and place them under ideal hygienic conditions, we should rob distemper of its sting. Practical experience teaches us this. I would go even further and suggest that TRUE distemper in itself is a benign disease."

I agree with Mr. Scott that secondary invaders do cause most, if not all of the advanced symptoms in naturally occurring cases, or perhaps it would be better to say that they ASSIST in producing them. I do not, however, agree that "if we could take our patients in hand at the first rigor and place . . . distemper of its sting." Mr. Scott says that "I think it must be accepted that the root cause of distemper is an ultra-microscopic virus. If this is Mr. Scott's opinion, and I thoroughly agree with him, he is then a supporter of Carré and his epoch-making work in this disease.

Carré was easily able to transmit distemper by injection of filtered serous discharge from the nose of acute cases, and in this way produced a fatal distemper.

With regard to the question of the appearance of vesico pustules and their significance, I believe that this question is, of all the phenomena we are called upon to unravel, the most difficult. My view of the significance of these eruptions is that, although they may be present at some time during an attack of distemper, they are not an invariable lesion. I do not think they are always present in attacks of distemper or, if they are, they are present in situations which are obscure.

I, like many other veterinary surgeons, have seen them time and again in old bitches which have been definitely known to have had a very severe attack of distemper in their youth, and I have also observed that some puppies of a litter will shew evidence of vesico pustules while others will not, and none of them, with or without eruptions, have shewn any constitutional symptoms whatever, although they have subsequently been shewn to be susceptible to distemper.

I am glad Mr. Scott has continued the discussion of this question, and personally offer him my thanks, and take this opportunity of falling into line with Mr. Scott's suggestion and enter into the discussion.—

Rhodes Farm, George W. Dunkin.
Mill Hill, N.W.7

"Capped Elbow" and Soundness.

To the Editor of The Veterinary Record.

Sir,—I shall be pleased to hear the opinions of other veterinary surgeons with regard to certifying a horse sound which has a capped elbow. My case is a vanner, five years old, showing a decided swelling, the size of a hen's egg, at the point of the elbow—distinctly the commencing of the characteristic swelling seen in cases of capped elbow. I am of opinion that this gelding is unsound. Since my examination I have been informed that two veterinary surgeons have passed him as sound.—Yours faithfully, Alexander Pottie, Jun. Greenock,

March 11th, 1925.

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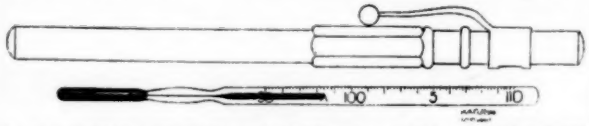

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